

7). Claims 2 and 6 have been amended to clarify further that the claimed subject matter is a hollow nanotube having an inner diameter of 5nm or less and the difference between the outer diameter and the inner diameter is 10nm or less. Claims 4, 7, and 9 have been amended to correct obvious editorial errors. No new matter has been introduced. Therefore, claims 1-12 are pending and are at issue.

In the Office Action mailed January 30, 2002 the Examiner required restriction to one of the following groups under 35 U.S.C. 121:

- I. Claims 1-9, drawn to a fiber, classified in class 423, subclass 447.2.
- II. Claims 10-12, drawn to a process for making it, classified in class 423, subclass 447.3.

In the Official Action mailed July 23, 2002 the election with traverse was noted but was not taken as a traverse. The election requirement is respectfully traversed. The search class of the two groups is identical and the subclasses are closely related. Search and examination of the entire application can be made without undue burden on the Examiner. Accordingly, applicants request that the Examiner modify the Requirement for Restriction and examine claims 1-12 together.

Claims 1-9 stand rejected under 35 U.S.C. 102(b) as anticipated by Jose-Yacaman et al., Appl. Phys. Lett. (1993) with Ohta et al., U.S. Patent No. 5,489,477, and Nolan et al., U.S. Patent No. 5,965,267. The latter two patents were cited to evidence inherent properties of the primary references. The Examiner explains that Jose-Yacaman et al. describes carbon nanotubes of rolled graphitic planes.

The rejection is respectfully traversed and reconsideration is requested.

Jose-Yacaman et al. actually describes spiral or helical nanotubes on pgs. 657 and 658. These fibers are grown with a metallic catalyst which produces a different nanotube than presently claimed. The material of Iijima's Nature article is also spiral or helical. However, the nanotubes of the present invention are tube-shaped or annular.

The tube-shaped or annular nature of the present nanotube is repeated throughout the specification. A tube is a long, hollow, cylindrical body; a pipe.(Standard College Dictionary, Text Edition 1973 p.1439; attached hereto as Exhibit A).

Jose-Yacaman and Ohta do not disclose a specified wall thickness. The wall thickness of the present invention is a maximum of 10nm because mechanical, electrical and other properties are inferior at greater thicknesses.

Nolan et al. columns 1-2 states that the nanotube-like filaments of Jose-Yacaman are formed from benzene and comments on the hydrogen content of the Jose Yacaman filaments based on the method of formation. This is a misstatement of Jose-Yacaman, which states on page 657, "[o]ur method in this particular study consists in the catalytic decomposition of acetylene over iron particles supported on graphite". Nolan's conclusions as to the hydrogen content of the Jose Yacaman filaments are based on an error. Jose-Yacaman did not use benzene and there is

nothing to suggest that the results seen with acetylene can be extended to benzene. Accordingly withdrawal of this rejection is respectfully requested.

Claims 1 and 2 stand rejected under 35 U.S.C. 102(b) as being anticipated by Ohta et al, with Nolan et al. cited for inherent properties.

The rejection is respectfully traversed and reconsideration is requested.

The present invention does not claim the C60 bulge, or soccer ball-like carbon material, of Ohta et al. As noted above, Nolan's conclusions as to the hydrogen content of Jose-Yacaman's nanotube-like filaments were based on an erroneous assumption.

Therefore, in view of the above amendments and remarks, it is respectfully requested that the application be reconsidered and that all pending claims be allowed and the case passed to issue.

If there are any other issues remaining which the Examiner believes could be resolved through either a Supplemental Response or an Examiner's Amendment, the

Examiner is respectfully requested to contact the undersigned at the telephone number indicated below.

Respectfully submitted,



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Serial No. 09/615,104
Response to Office Action dated July 23, 2002

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PATENT TRADEMARK OFFICE

Docket No: 9496/OL410

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Takashi Ohsaki

Serial No.: 09/615,104

Art Unit: 1754

Confirmation No.: 4085

Filed: 07/13/00

Examiner: Stuart Hendrickson

For: CARBONACEOUS NANOTUBE, NANOTUBE AGGREGATE, METHOD FOR MANUFACTURING A CARBONACEOUS NANOTUBE

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MARK-UP VERSION FOR RESPONSE TO OFFICE ACTION

Assistant Commissioner for
Patents
Washington, DC 20231

October 15, 2002

Sir:

This is in response to the Official Action mailed July 23, 2002 received in the above-identified application. Please amend the application as follows:

IN THE CLAIMS:

1. (Amended) A carbonaceous hollow nanotube[,] comprising: a carbon material and [hollow part] having an inner diameter [of, at most,] less than or equal to 5nm; and an outer diameter wherein the difference between said outer diameter and said inner diameter is equal to or less than

[a thickness part having a thickness of, at most, 10nm] 20nm; [and] said [thickness part being a] carbon material comprising hydrogen atoms and carbon atoms; wherein said nanotube is tube-shaped.

2. (Amended) The carbonaceous nanotube according to claim 1, wherein [said thickness part is, at most, 5nm] the difference between said outer diameter and said inner diameter is equal to or less than [5nm] 10nm.

4. (Amended) The carbonaceous nanotube according to claim [1] 3, wherein said transition metal is iron.

5. (Amended) A fiber aggregate, comprising:
carbonaceous hollow nanotubes [having a hollow part having an inner diameter of, at most, 5nm, a thickness part,] comprising [carbon atoms and hydrogen

atoms, having a thickness of, at most, 10nm] a carbon material and having an inner diameter of less than or equal to 5nm; and an outer diameter wherein the difference between said outer diameter and said inner diameter is equal to or less than 20nm;
said carbon material comprising hydrogen atoms and carbon atoms;

said carbonaceous nanotubes [being present at a ratio of] comprising at least 70 weight % [with respect to] of said fiber aggregate;
said hydrogen atoms [at a content ratio of] comprising 0.1[~]to 1 weight % [with respect to] of said fiber aggregate; and

said carbon atoms [at a content ratio of] comprising at least 98.5 weight % [with respect to] of said fiber aggregate; wherein said nanotubes are tube-shaped.

6. (Amended) The fiber aggregate according to claim 5, wherein [said thickness part has a thickness of, at most, 5nm] the difference between said outer diameter and said inner diameter is equal to or less than 10nm.

7. (Amended) The fiber aggregate according to claim 5, further comprising at least [on] one transition metal atom.

9. (Amended) The fiber aggregate according to claim 7, wherein said at least one transition metal atom [is at a content ratio of] comprising 0.005 [~]to 1 weight % [with respect to] of said aggregate.